

REMARKS

This communication is responsive to the Office Action mailed April 6, 2005.

Claims 1-56 and 59-65 remain in this application. Claims 57-58 and 66-67 are canceled.

In the Office Action, the Examiner rejected claim 39 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. In particular, the phrase "each of said segment is identification as likely including a play of said baseball" was found indefinite. Claim 39 is currently amended to adopt the Examiner's suggestion.

Claims 33, 42, and 43 stand rejected under 35 USC 102(b) as being anticipated by "Indexing of Baseball Telecast for Content-based Video Retrieval", Kawashima et al. ("Kawashima").

Kawashima discloses a system for indexing a baseball telecast for content-based video retrieval. In particular, Kawashima discloses a first stage that detects a basic scene. The exact location of pitching and batting actions is determined using continuous dynamic programming matching for fixed areas of the image. A set of frames are modeled against a similarity measure, and a minimal warp function is used to compare the input video sequence with pitching/batting model sequences. Thereafter, the end of the segments is identified from a rough estimate of the camera viewing angle of the next scene cut just after the pitching. See Kawashima, section 2.1.4. Accordingly, after identifying the start of the segment using the model sequence of frames the next scene cut is used to identify the end of the segment.

By contrast, claim 33 claims in part, detecting more than one scene change during a baseball video segment, such as multiple scene changes during a play of baseball, and identifying as the end of the segment, or end of the play, a scene change other than the first scene change

during the segment. That is, claim 33, as amended, patentably distinguishes over Kawashima, at least in part, by claiming identifying a plurality of segments of the baseball video, wherein a start of at least one of the segments is first identified and then an end of the segment is identified based upon detecting a plurality of subsequent scene changes, wherein a first scene change detected after the start of the segment is free from being selected as the end of the segment, wherein a subsequent scene change detected after the first scene change is selected as the end of the segment.

Claims 34-35 depend from claim 33 and are, therefore, patentable for at least the same reasons asserted for claim 33.

Kawashima discloses a method for summarizing a video whereby the start of a segment is of an at bat sequence (page 872, section 1.2). The process to find the at bat sequence necessarily involves model-based matching and action spotting (page 872, Figure 1). However, the model-based approach of Kawashima does not disclose anything whatsoever related to processing that characterizes the relative position of a batter and whether the batter is sufficiently close to at least one of a catcher and an umpire proximate home base as claimed in claim 42.

Claim 42 patentably distinguishes over Kawashima by claiming processing that characterizes a relative position of a batter and whether the batter is sufficiently close to at least one of a catcher and an umpire proximate home base. Kawashima fails to include such a characterization.

Claim 43 depends from claim 42 and is, therefore, patentable for at least the same reasons asserted for claim 42.

Claims 47-48 and 59-64 stand rejected under 35 USC 102(e) as being anticipated by “Automatically Extracting Highlights for TV Baseball Programs”, Rui et al. (“Rui”).

Rui discloses a system for extracting highlights for TV baseball programs using audio-track features alone without relying on video-track features (abstract; page 105, introduction section, right column). That is, Rui is directed to audio-only highlight extraction and has nothing whatsoever to do with highlight extraction based upon a visual (non-audio) event, such as when the ball is put into play, as claimed in amended claim 47.

Claim 47 patentably distinguishes over Rui by claiming creating a summarization of the video based upon analysis of a visual image portion of the video by including said plurality of segments and removing at least one of the segments from the summary based, at least in part, upon audio information related to the at least one of the segments.

Claim 48 depends from claim 47 and is, therefore, patentable for at least the same reasons asserted for claim 47.

Rui discloses a system for extracting highlights. The Applicants respectfully suggest that there is no service provider, description, nor remote user. As in the prior Office Action, the Examiner points to “a video summary is transmitted in response to user’s request via indicies/descriptions” on page 105. Also as in the prior Office Action, the Applicants are unable to locate such a comment in Rui. Nevertheless, the Applicants have amended claim 59 to claim a service provider remotely located from a user, which is not the same as a remote control used by a user. Rui does not disclose a service provider remotely located from a user as claimed in amended claim 59.

That is, claim 59 patentably distinguishes over Rui by claiming a service provider remotely located from a user identifying a summary of a video, the service provider identifying a description of the summary, and the service provider providing the summary and the description to the user in response to receiving a request for the summary from the user.

Claim 60 depends from claim 59 and is, therefore, patentable for at least the same reasons asserted for claim 59.

Claim 61, as amended, patentably distinguishes over Rui by claiming a service provider remotely located from a user storing a summary of a video that includes baseball and the service provider providing the summary in the form of streaming video to the user that is interconnected to the service provider by a network, in response to receiving a request for the summary from the user.

Claim 62 depends from claim 61 and is, therefore, patentable for at least the same reasons asserted for claim 61.

Claim 63, as amended, patentably distinguishes over Rui by claiming a service provider remotely located from a user storing a description of a summary of a video that includes baseball and the service provider providing the description to the user that is interconnected to the service provider by a network in response to receiving a request for the summary from the user.

Claim 64 depends from claim 63 and is, therefore, patentable for at least the same reasons asserted for claim 63.

Claims 1-5, 7-12, 29, and 31-32 stand rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of Okayama et al. (US 6,556,767) (“Okayama”).

The Examiner notes that Kawashima fails to disclose an event being characterized in a manner free from using a model sequence of frames to determine the approximate frame that the ball is put into play. In particular, Kawashima explicitly teach the using of a model sequence of frames to determine the approximate frame that the ball is put into play. This is a technique that is based upon attempting to model the characteristics of a baseball game. In contrast, claim 1

claims a technique that does not attempt to model the characteristics of a baseball game when the ball is put into play and considered out of play, but rather relies on other non-model based techniques.

The Examiner suggests that Okayama discloses characterizing an event in a manner free from using a model sequence of frames. However, there is no suggestion that Okayama would be applicable to summarizing baseball, there is no suggestion that Okayama would be applicable to identifying events in baseball, nor is there any suggestion to modify Kawashima with a non-model based technique.

Claim 1 patentable distinguishes over the cited references by claiming the identification of events of a video that includes baseball, and in particular the time when a ball is put into play and the ball is considered out of play.

Claims 2-4 depend from claim 1 and are, therefore, patentable for at least the same reasons asserted for claim 1.

Claim 5 patentably distinguishes over the cited references by claiming, in part, identifying a plurality of segments of the video based upon a series of activities defined by the rules of baseball that could potentially result in a least one of (1) a score, (2) preventing a score, (3) advancing a team toward a score, and (4) preventing advancing a team toward a score, where the identifying a plurality of segments of the video is in a manner free from using a model sequence of frames, free from using an action spotting technique, and free from using a pixel-by-pixel comparison.

Claims 6-8 depend from claim 5 and are, therefore, patentable for at least the same reasons asserted for claim 5.

Claim 9 patentably distinguishes over the cited references by claiming, in part, identifying a plurality of segments of the video based upon detecting a play of the baseball game, wherein the identifying includes detecting the start of the play in a manner free from using a model sequence of frames to determine the approximate frame that a ball is put into play, and further wherein the identifying is in a manner free from using an action spotting technique and free from using a pixel-by-pixel comparison.

Claims 10-12 depend from claim 9 and are, therefore, patentable for at least the same reasons asserted for claim 9.

Kawashima clearly teaches that their technique for locating the segments is based upon using a model sequence of frames. See, figure 1.

Claim 29 patentably distinguishes over Kawashima by claiming identifying a plurality of segments of said baseball video, wherein said identifying for at least one of said segments is free from using a model sequence of frames, wherein said identifying for the end of at least one of said segments is based upon detecting a scene change, where each of said segments includes a plurality of frames of said baseball video.

Claims 30-32 depend from claim 29 and are, therefore, patentable for at least the same reasons asserted for claim 29.

Claim 6 stands rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of Okayama et al. (“Okayama”) as applied to claim 5, and further in view of “Automatically Extracting Highlights for TV Baseball Programs”, Rui et al. (“Rui”).

Claim 6 depends from claim 5 and is, therefore, patentable for at least the same reasons asserted for claim 5.

Claims 13-26, 35, 39, 44, 45, and 51-53 stand rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of “Multimedia Content Analysis”, Wang et al. (“Wang”).

Kawashima discloses a system for indexing baseball telecast for content-based video retrieval. In particular, Kawashima discloses a first stage that detects domain specific scene in baseball video based-on image similarity, referred to as a basic scene. The first stage is determined based upon using a similarity measure between an input image and a model image, together with a threshold. In a second stage, the exact location of pitching and batting actions is determined using continuous dynamic programming matching for fixed areas of the image. Accordingly, Kawashima discloses using a similarity measure between a pair of frames and a model sequence of frames to determine the approximate frame that the ball is put into play, again based upon a set of model sequence. In essence, Kawashima teaches a technique based upon interpreting the video containing baseball in order to identify portions of interest.

With respect to claim 13, the Examiner states that Kawashima identifies a plurality of video segments based upon color characteristics of the video. In particular, section 1.1 relates to indexing of a baseball game by the recognition of an at bat and the identification of the player, where merely state a desirable goal for Kawashima but is unrelated to how that goal is achieved. Section 1.1 has nothing to do with color characteristics of the video. Section 1.2 relates to the summarization of the video using indexes which merely states the desirability of reducing the amount of database store and has nothing to do with color characteristics of the video. Section 2.1 relates to the segmentation process which is based, in part, on the use of model-based matching (step 2 of figure 1) and action spotting techniques (step 3 of figure 1). Section 2.1

further discloses determining the first frame of the next show based upon a similarly measurement using color histograms (step 4). Accordingly, the technique uses model-based matching and action spotting techniques to detect a basic scene, with the first frame of the next shot determined based upon using a color histogram. However, the applicant respectfully suggests that the color histogram do not include any particular spatial information regarding the location of particular colors within the video.

It is possible to develop highly sophisticated models of a typical baseball video to identify potentially relevant portions of the video, as taught by Kawashima. However, such highly sophisticated models are difficult to create and are not normally robust. Further, the likelihood that a majority of the highly relevant portions of the baseball video will be included in such a video summarization is low because of the selectivity of the model. Thus the resulting video summarization of the baseball game may simply be unsatisfactory to the average viewer.

After consideration of the difficulty of developing highly sophisticated models of a baseball video to analyze the content of the baseball video, as the sole basis upon which to create a baseball summarization, the present inventors determined that this technique is ultimately flawed as the models will likely never be sufficiently robust to detect all the desirable content. Moreover, the number of different types of model sequences of potentially desirable content is difficult to quantify. In contrast to attempting to detect particular model sequences, the present inventors determined that the desirable segments of the baseball game are preferably selected based upon a "play." A "play" may be defined as an sequence of events defined by the rules of baseball. In particular, the sequence of events of a "play" may be defined as the time generally at which the ball is put into play (e.g., a time based upon when the ball is put into play) and the time generally at which when the ball is considered out of play (e.g., a time based upon when the

ball is considered out of play). Normally the “play” would include a related series of activities that could potentially result in a score (or a related series of activities that could prevent a score) and/or otherwise advancing the team toward scoring (or prevent advancing the team toward scoring).

The present inventors then considered how to detect a “play” from a baseball video in a robust, efficient, and computationally effective manner. After extensive analysis of a typical baseball game it was determined that a baseball game is usually captured by cameras positioned at fixed locations around the baseball field, with each camera typically capable of panning, tilting, and zooming. Each play in a baseball game normally starts with the pitcher releasing the ball, such as toward the catcher or toward one of the basemen. Further, a pitching scene, in which the pitcher is about to throw the ball, is usually captured from a camera location behind the pitcher. This camera angle is typically used because it is easier to observe the movements of all of the parties involved (the pitcher, the batter, the catcher, and the umpire) from this viewpoint.

It is based upon these observations regarding the characteristics of a baseball broadcast and realization that part of the problem is the inability of complex sophisticated models to be sufficiently robust and computationally efficient that a region of generally green color and a region of a generally brown color should be used. Without any such realizations, there would be no motivation to modify Kawashima to include color characteristics.

Claim 13 patentably distinguishes over Kawashima in view of Wang by claiming the start of the plurality of segments is identified based upon detecting at least one region of a generally green color in a generally lower region of the video and at least two regions of a generally brown

color in a pair of spaced apart horizontal regions where the generally green region is between the horizontal regions.

The Applicants would respectfully suggest that section 2.1.3 of Kawashima fails to suggest using spatial characteristics of the color regions.

Claims 14-18 depend from claim 13 and are, therefore, patentable for at least the same reasons asserted for claim 13.

As previously described, it is based upon those observations regarding the characteristics of a baseball broadcast and realization that part of the problem is the inability of complex sophisticated models to be sufficiently robust and computationally efficient that a different approach is desirable. Based upon a different approach it was determined that three horizontally oriented regions of generally homogenous colors including at least one of generally brown and generally green is beneficial. Without any such realizations, there would be no motivation to modify Kawashima to include spatial color characteristics of the regions.

Claim 19 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the video, wherein the start of said plurality of segments is identified based upon detecting at least three regions of horizontally oriented regions of generally homogenous colors including at least one of generally brown and generally green, where each of the segments includes a plurality of frames of said video.

Claims 20-23 depend from claim 19 and are, therefore, patentable for at least the same reasons asserted for claim 19.

The applicant would respectfully suggest that section 2.1.3 of Kawashima uses count of pixels whose intensity change in successive frames are larger than a threshold. There is no use of color characteristics disclosed by Kawashima to identify the play itself.

As previously described, it is based upon those observations regarding the characteristics of a baseball broadcast and realization that part of the problem is the inability of complex sophisticated models to be sufficiently robust and computationally efficient that a separate model is desirable. Without any such realizations, there would be no motivation to modify Kawashima to include spatial color characteristics to determine the start of a segment in baseball.

Claim 24 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the video, identifying a plurality of segments of said video, wherein the start of said plurality of segments is identified based upon identifying at least three spatial regions of sufficient spatial coherence and sufficient horizontal extent in a generally lower region of the video, where each of the segments includes a plurality of frames of the video.

It is noted that Wang, page 33 lines 27-46, relates to color histograms, color layout, shape, etc. However, there is no suggestion in Kawashima that there would be any desirability of the claimed regions for determining the start of a segment of baseball.

Claims 25-26 depend from claim 24 and are, therefore, patentable for at least the same reasons asserted for claim 24.

The Applicants would respectfully suggest that section 2.1.3 of Kawashima uses count of pixels whose intensity change in successive frames that are larger than a threshold. There is no use of color disclosed by Kawashima to identify the play itself.

The Examiner notes that Kawashima fails to disclose the identification of a segment that has a temporally sufficient short duration. Wang fails to suggest in the application of baseball summarization the desirability to remove segments of sufficiently short duration. The motivation to remove such segments is that such segments are likely to be a false positive.

Claim 39 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the video, identifying a plurality of segments of the video, where each of the segments is identified as including a play of baseball, such that a plurality of segments are identified by the system as including a play of baseball; identifying at least one of the segments identified as including a play of baseball that has a temporally sufficiently short duration; based upon the identifying removing the identified segment from the plurality of segments; and creating a summarization of the video by including said plurality of segments without the removed segment.

Claims 40-41 depend from claim 39 and are, therefore, patentable for at least the same reasons asserted for claim 39.

The Examiner notes that Kawashima fails to disclose the identification of a commercial that is temporally close to a segment of baseball. Wang fails to suggest, in the application of baseball, the desirability to remove otherwise valid segments of baseball sufficiently close to a commercial.

Claim 44 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the video wherein each of the segments includes a play of baseball, identifying a commercial within the video, and creating a summarization of the video by including the plurality of segments, where the summarization includes fewer frames than the video, where at least one of the plurality of segments of the video that is determined to be sufficiently temporally close to the commercial is not included within the summarization but would have otherwise been included within the summarization.

The cited references fail to disclose removing a segment identified as including a play of baseball based upon identifying a sufficiently temporally close commercial.

Claim 45 depends from claim 44 and is, therefore, patentable at least for the same reasons asserted for claim 44.

The Examiner notes that Kawashima fails to disclose the use of textures. The applicant would respectfully suggest that Kawashima uses an intensity comparison technique that does not analyze spatial regions of the image to determine the start of a segment. Accordingly, there would be no motivation to include any type of spatial textural regions in the system of Kawashima to identify the start of a segment.

Claim 51 patentably distinguishes over Kawashima in view of Wang by claiming identifying wherein the start of the plurality of segments is identified based upon detecting different spatial regions having generally homogenous different textures.

Claim 52 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the video, wherein the start of the plurality of segments is identified based upon the video being free from substantial translational motion.

Claim 53 patentably distinguishes over Kawashima in view of Wang by claiming identifying a plurality of segments of the baseball video, wherein the identifying for the end of at least one of the segments is based upon detecting a scene change, where the scene change is not used to identify the end of the at least one of the segments if the temporally relevant portion of the at least one the segment includes substantial horizontal motion, where each of the segments includes a plurality of frames of the baseball video.

Claims 27 and 28 stand rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of “Multimedia Content Analysis”, Wang et al. (“Wang”), and further in view of Okayama et al. (“Okayama”).

Kawashima detects the start of a frame based upon the modeling technique for a sequence of motion events (see Figure 1, steps 1 through 3). There is no suggestion in Kawashima to modify its technique to remove candidate frames as the start of a play by comparison of a single frame to another temporally relevant single frame. Rather, Kawashima relies on model-based matching and action spotting to determine the start of a play, which are both multi-frame based techniques.

Claim 27 patentably distinguishes over the art of record by claiming identifying a plurality of segments of the video including a play, wherein the identifying for at least one of the segments includes detecting the start of the segment of a play based upon processing of a first single frame of the video independently of other frames and removing the single frame as the start of said segment including a play based upon processing of another single frame temporally relevant to the first single frame independently of other frames.

Claim 28 depends from claim 27 and is, therefore, patentable for at least the same reasons asserted for claim 27.

Claim 34 stands rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of Okayama et al. (“Okayama”) as applied to claim 29, and further in view of “Video Summarization Using Hidden Markov Model”, Huang et al. (“Huang”).

Claim 34 depends from claim 33 and is, therefore, patentable for at least the reasons asserted for claim 33.

Claims 36-38 and 40-41 stand rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al.

(“Kawashima”) in view of “Multimedia Content Analysis”, Wang et al. (“Wang”) and further in view of “Automatically Extracting Highlights for TV Baseball Programs”, Rui et al. (“Rui”).

Claim 36 patentably distinguishes over Kawashima in view of Wang and further in view of Rui by claiming identifying a plurality of segments of the video based upon said identifying as a result of creating a modified continuous segment by including a portion of the video identified during the sufficiently short duration, an identified segment immediately proceeding the portion, and an identified segment immediately subsequent to the portion.

There is no suggestion in these references to create a new segment as including the region not identified as a play.

Claims 37-38 depend from claim 36 and are, therefore, patentable for at least the same reasons asserted for claim 36.

Claims 40-41 depend from claim 39 and are, therefore, patentable for at least the same reasons asserted for claim 39.

Claim 46 stands rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of “Detection of Slow-Motion Replay Segments in Sports Video for Highlights Generation”, Pan et al. (“Pan”), and further in view of Okayama et al. (“Okayama”).

Claim 46 patentably distinguishes over the referenced art by claiming, in part, identifying a plurality of segments of the video wherein each of the segments includes a play of baseball, wherein the identifying is in a manner free from using a model sequence of frames to determine the approximate frame that the play starts, wherein the segments include full-speed plays and slow motion plays of the full-speed plays, and further wherein the identifying is in a manner free from using an action spotting technique and free from using a pixel-by-pixel comparison.

Claims 49-50 stand rejected under 35 USC 102(e) as being anticipated by “Automatically Extracting Highlights for TV Baseball Programs”, Rui et al. (“Rui”) in view of “Multimedia Content Analysis”, Wang et al. (“Wang”).

Rui discloses the identification of highlights using audio-track features alone without relying on expensive-to-compute video track features. See, Rui, introduction, column 2.

Claim 49 patentably distinguishes over Rui in view of Wang by claiming identifying a plurality of segments of the video, where the identifying is based upon analysis of frames of the video, wherein each of the segments includes a play of baseball.

Claim 50 depends from claim 49 and is, therefore, patentable for at least the same reasons asserted for claim 49.

Claims 54-56 stands rejected 35 USC 103(a) as being unpatentable over “Automatically Extracting Highlights for TV Baseball Programs”, Rui et al. (“Rui”) in view of Kim et al. (US 2004/0125124) (“Kim”).

Rui discloses the identification of highlights using audio-track features alone without relying on expensive-to-compute video track features. See, Rui, introduction, column 2.

Claim 54 patently distinguishes over the referenced art by claiming, in part, identifying a plurality of segments of the video based upon the TV-Anytime compliant description scheme, where the identifying is based upon analysis of frames of the video.

Claims 55-56 depend from claim 54 and are, therefore, patentable for at least the same reasons asserted for claim 54.

Claim 65 stands rejected under 35 USC 103(a) as being unpatentable over “Indexing of Baseball Telecast for Content-based Video Retrieval”, Kawashima et al. (“Kawashima”) in view of Kim et al. (“Kim”).


The Applicants respectfully submit that Kawashima at most describes the storing of clips in a database that are retrievable from a browsing system by specifying the type of clip (i.e. hit, homer, struck out), innings, score, and count. Accordingly, the clips are organized in some manner without regard to operation with other data systems and sources.

Claim 65 patentably distinguishes over the referenced art providing a TV-Anytime compliant description scheme of the video because there is no suggestion whatsoever in Kawashima that there would be any benefit to incorporate a TV-Anytime compliant description scheme or the teachings of Kim.

The Applicants respectfully submit that all the pending claims should now be in a form suitable for allowance, and allowance of such claims is requested. If the Examiner for any reason believes that direct communication would advance the prosecution of this case, the Examiner is invited to contact the Applicants' counsel at the number below.

Respectfully submitted,

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